

CLAIMS

1. A centralized node for coupling into a computer network along which network traffic flows between a plurality of nodes in a form of packets, programmed to perform the steps of:

- identifying requirements of unicast packet traffic along the network, wherein the unicast packet traffic identifies a first traffic configuration along the network; and
5 constructing a second traffic configuration along the network, differing from the first traffic configuration, wherein the second traffic configuration is for routing multicast packet traffic along the network.

2. The centralized node of claim 1 and further programmed to perform the step of communicating routing information representing at least a portion of the second traffic configuration to each node in the plurality of nodes, wherein each node in the plurality of nodes routes multicast packet traffic in response to the at least a portion of the
5 second traffic configuration.

3. The centralized node of claim 2:
wherein the step of constructing a second traffic configuration comprises constructing a Steiner tree along the network; and
wherein the at least a portion of the second traffic configuration communicated to
5 each node corresponds to the connectivity of the respective node along the Steiner tree.

4. The centralized node of claim 3 wherein the at least a portion of the second traffic configuration indicates, to a receiving node that receives the at least a portion of the second traffic configuration, selected instances during which a received packet is to be communicated to multiple nodes in the plurality of nodes.

5. The centralized node of claim 2 wherein the step of constructing a second traffic configuration comprises minimizing a cost function for all the nodes in the plurality of nodes.

6. The centralized node of claim 1 wherein the step of constructing a second traffic configuration comprises constructing a Steiner tree along the network.

7. The centralized node of claim 6:

wherein for unicast communications each node in the plurality of nodes is bi-directionally coupled to each other node in the plurality of nodes by a pair of Label Switched Paths; and

5 wherein the step of constructing a Steiner tree comprises optimizing a cost that is selected from a greater of a cost associated with a first Label Switched Path in the pair of Label Switched Paths and a cost associated with a second Label Switched Path in the pair of Label Switched Paths.

8. The centralized node of claim 6 wherein the step of constructing a second traffic configuration further comprises supplementing the Steiner tree along the network by constructing one or more source based trees along the network.

9. The centralized node of claim 8:

and further programmed to perform the step of communicating table routing information representing at least a portion of the second traffic configuration to each node in the plurality of nodes;

5 wherein each node in the plurality of nodes routes multicast packet traffic in response to the table routing information;

wherein the table routing information comprises Steiner tree entries that indicate a next hop for a received packet by associating a group to which a receiving node belongs with a destination node in the plurality of nodes; and

10 wherein the table routing information further comprises source based tree entries that indicate a next hop for a received packet by associating a group to which a receiving node belongs and an ingress node in the plurality of nodes with a destination node in the plurality of nodes.

10. The centralized node of claim 9 wherein each node in the plurality of nodes is programmed to perform a step of identifying an association between the respective node when it is operating as an ingress node and one or more MAC addresses external from the network.

11. The centralized node of claim 9 wherein the table routing information indicates, to a receiving node that receives the table routing information, selected instances during which a received packet is to be communicated to multiple nodes in the plurality of nodes.

12. The centralized node of claim 11 wherein the network comprises a Metro Ethernet network.

13. The centralized node of claim 12 wherein the plurality of nodes comprises a virtual private local area network service.

14. The centralized node of claim 1:
wherein each node in the plurality of nodes comprises a Provider Edge node; and
wherein for unicast communications each Provider Edge node in the plurality of
nodes is coupled to communicate directly with each other Provider Edge node in the
5 plurality of nodes.

15. The centralized node of claim 1 wherein the centralized node is one node
in the plurality of nodes.

16. The centralized node of claim 1:
wherein the plurality of nodes comprises more than one group of nodes;
wherein the step of constructing a second traffic configuration along the network
comprises constructing the second traffic configuration for a first group of nodes in the
5 more than one group of nodes; and
wherein the centralized node is further programmed to perform a step of
constructing a different respective second traffic configuration along the network for each
group in the more than one group of nodes.

17. The centralized node of claim 16 wherein the step of constructing a
different respective second traffic configuration comprises, for each different respective
second traffic configuration:
constructing a Steiner tree along the network; and
5 supplementing the Steiner tree along the network by constructing one or more
source based trees along the network.

18. A method of operating a computer network along which network traffic flows between a plurality of nodes in a form of packets, comprising:

- communicating unicast packet traffic along the network according to a first traffic configuration along the network; and
- communicating multicast packet traffic along the network according to a second traffic configuration along the network, wherein the second traffic configuration differs from the first traffic configuration.

19. The method of claim 18 and further comprising constructing the second traffic configuration by the steps of:

- constructing a Steiner tree along the network; and
- supplementing the Steiner tree along the network by constructing one or more source based trees along the network.

20. A node for coupling into a computer network along which network traffic flows between a plurality of nodes in a form of packets, wherein the plurality of nodes includes the node for coupling, the node for coupling programmed to perform the steps of:

5 communicating unicast packet traffic along the network according to a first traffic configuration along the network; and

communicating multicast packet traffic along the network according to a second traffic configuration along the network, wherein the second traffic configuration differs from the first traffic configuration.

21. The node for coupling of claim 20 and further programmed to perform the steps of receiving, along the network, table routing information representing at least a portion of the second traffic configuration, wherein the table routing information is responsive to at least a portion of a Steiner tree along the network.

22. The node for coupling of claim 21 wherein the table routing information is further responsive to one or more source based trees along the network.

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